1 FEBRUARY 1957

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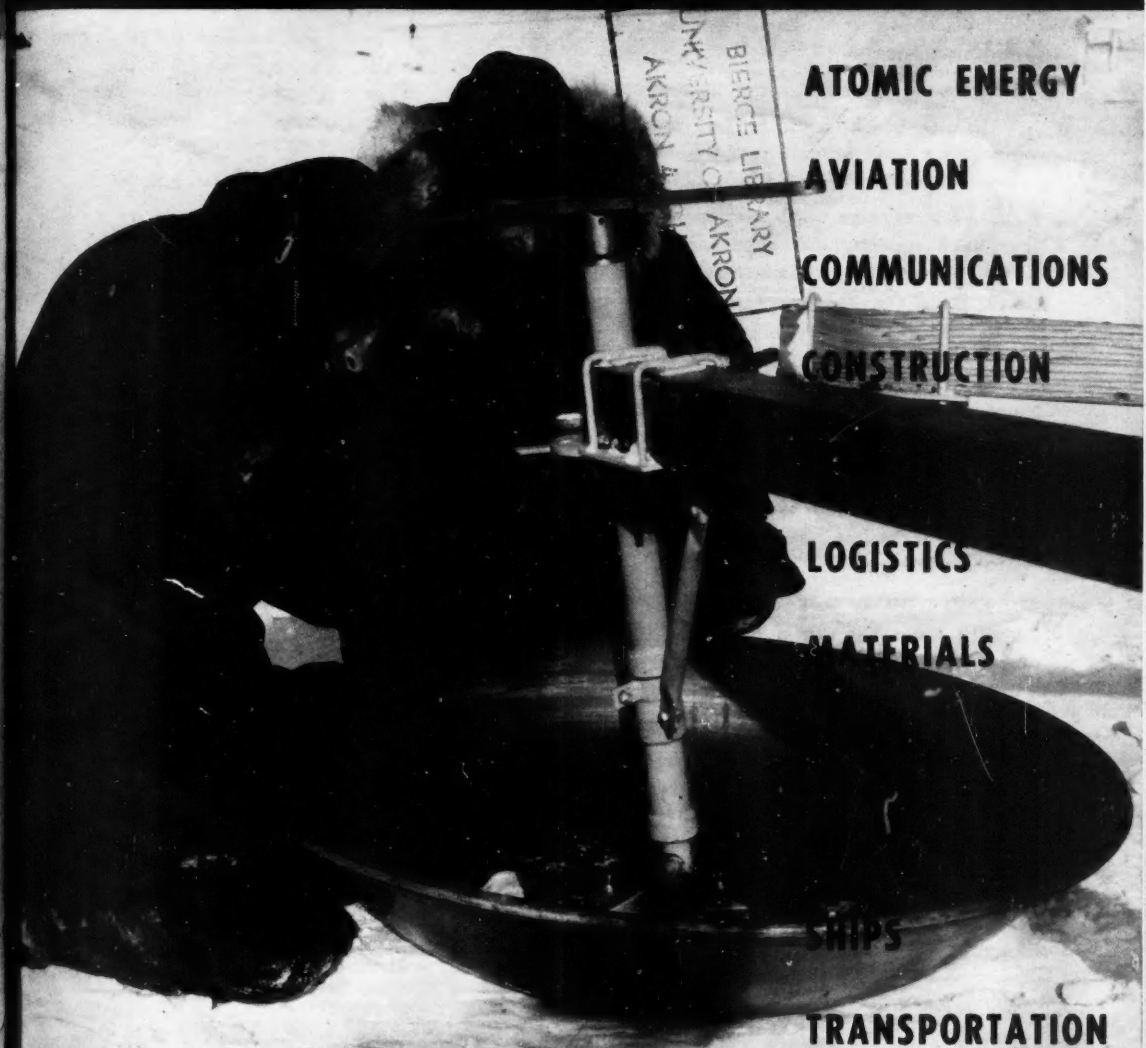
OVERNMENT RESEARCH AND DEVELOPMENT DIGEST VOL. 2, NO. 2




ATOMIC ENERGY

AVIATION

COMMUNICATIONS

CONSTRUCTION

LOGISTICS

MATERIALS

SHIPS

TRANSPORTATION

In This Issue . . .

100. ANTARCTIC CREVASSE DETECTOR

# data

Box 6026
Arlington 6, Virginia

Murray Q. Smith, Editor

Vera Cole, Art Editor

Colonel Joseph H. Kusner, USAF,
Military Consultant

Department Editors

William O. Foss, Harold Helfer,
Venlo Wolfson, Bernard Katz,
Jim Pastorius, Pat Groseclose

DATA provides a rapid information link between industry and government. It is designed to give readers a quick scan of the latest developments in the military services and government agencies on a wide range of topics. Speeches and interviews of special significance are covered and reviewed by DATA.

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Arlington 6, Virginia.

Editorial Office: 2600 South Wayne St.,
Suite 1, Arlington 6, Va. Phone Otis 4-8129

Mid-West Sales & Publishing Office: DATA,
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# ...a word to industry...

As former Chief of Material and Chief of the Bureau of Supplies and Accounts, perhaps I can pass on some helpful information to some of the smaller producers who read this magazine.

Many small contractors would be better off if they forgot all about direct government contracts and would direct their energies toward obtaining subcontracts from the large prime contractors.

Regulations are fewer between a sub and prime contractor. The sub gets his payments promptly and the prime is more able to give personal assistance in solving the sub's problems. Most large military suppliers have small business representatives and are looking for subcontractors.

For the medium sized contractor, the big problem facing both the government and the contractor, is misunderstanding of the government contracts on the part of the company. Many company procurement managers just don't understand the contracts they sign.

My advice to any contractor, large or small, is to have a lawyer right with him to go over the contract at the time it is being signed so that any points not readily understood can be cleared up on the spot. It may save a lot of expensive renegotiation at a later date.

It isn't necessary to come to Washington to arrange subcontracting or obtain direct contract information. For Navy information, interested contractors should contact their local Inspectors of Naval Material or write to the Office of Naval Material, Navy Department, Washington 25, D. C.

For the small contractor interested in Navy business there are two books which are "musts". One is the Navy Small Business Directory and the other is Selling to Navy Prime Contractors. Both books are available at no cost from the Office of Navy Small Business, Main Navy Building, Washington 25, D. C.

Murrey L. Royar

MURREY L. ROYAR
Vice Admiral, U. S. Navy (Ret.)

Item 59.

1 February 1957

Dear DATA Readers:

Aircraft and guided missiles will go faster, higher and further in the future, increasing the problems of temperature, vibration and radiation in our avionic equipment. We use the term "avionic" to encompass armament, electronic and airborne navigational equipment, all of which controls the aircraft or guided missile from takeoff to delivery of weapons on the target.

Our primary effort is in the field of Research and Development, but our engineering interest and responsibilities are for the entire service life of the equipment.

There are certain generalities which are worth mentioning as basic philosophy before going into specifics here.

We are convinced that it takes much longer to develop electronic systems for an aircraft or missile than it does to build the vehicle. Consequently our personnel frequently find themselves opposing too early production of undeveloped electronic equipment. Therefore, it would appear most profitable to put emphasis on system, sub-system and component development so that similar equipment can be used in more than one aircraft or missile. The saving in technical manpower would be tremendous.

I believe the Armed Forces can help armament and electronic contractors by specifying equipment and sub-systems capable of top performance where available. An initial step is being taken in the Navy by suggesting to the electronics industry the use of modular construction whereby the building blocks can be fitted together by the system designers to meet the needs of various airframe spaces.

The Navy realizes the value of supporting new developments which can be made useful to industry. The following items come to mind as problem areas where industry and the service have mutual interests:

New Technique Development. As new techniques indicate profitable development areas, it is apparent that funds and technical manpower cannot support the building of new facilities and technical organizations in aircraft, missile as well as avionic companies. It would appear profitable to utilize the facilities and capabilities of avionic companies where possible.

Increased Detection Ranges. The Navy is continually interested in increasing its ranges of detection for all types of electronic search gear both in the air as well as undersea detection devices.

Data Processing. We go to great lengths to build a few knots of in-

creased speed into a fighter or bomber. And with faster warning information we have the equivalent of more speed built into our defensive aircraft and missiles.

Instrumentation. As performance increases, there is increased need for aircraft and missile range instrumentation as well as processing and analysis of the data. This data should be obtainable on every flight for analysis in time to correct defects rather than to corroborate crashes.

Personnel. Outstanding technical talent is in great demand, which might indicate that continued technical development should be planned around these talents. On the other hand, industry may be forced to use these people on many projects, thus leaving some of the more difficult problems in less competent hands than originally planned. A Navy project where volume production is not immediately apparent can frequently suffer from inattention.

Continued Development. Significant performance improvement in the service life of equipment can be attained by continued development or product improvement. I believe the services should contract for this extra engineering effort so that in overhaul the equipment can be improved.

Evaluation of Proposals. We frequently hear that Research and Development contracts are unprofitable, and yet contractors must continue in this field for many obvious reasons. But remember, by its very nature R&D can always invite redirection of effort and cost increases.

In the interest of briefness I have not mentioned many obvious problems such as reliability, nor have I mentioned specific areas such as communications, anti-submarine warfare, mine defense, fire control, weapon carriage and release mechanisms, and navigation. However, I hope that in the joint problem areas that have been mentioned, industry and the Navy will be working together to improve our aircraft and guided missiles.

Sincerely,

W. E. Sweeney

W. E. Sweeney
Captain, U. S. Navy
Director, Avionics Division
Bureau of Aeronautics

Item 60.

## 61. NEW TYPE NUCLEAR REACTION DISCOVERED:

A new type of nuclear reaction that yields energy has been reported by the Atomic Energy Commission.

Called a catalyzed nuclear reaction, the phenomenon was discovered by scientists at the University of California Radiation Laboratory. The new method marks the third system now known to scientists for obtaining thermonuclear reactions. Previously the only two methods known were (1) the fusion of two light nuclei into a heavier one by the use of one million degree temperatures, or (2) the bombardment of the nuclei with other nuclear particles from accelerators like cyclotrons or nuclear reactors.

In order to make a nuclear reaction take place, two nuclei must touch. The new discovery is a way of pulling two nuclei together so a proton and nucleus of heavy hydrogen (a deuteron) can combine to form helium-three with the release of 5.4 million volts of energy.

The new reaction is termed a catalyzed reaction because the mu meson, a heavy particle used to replace the normal electron during the reaction, is not consumed by the reaction. Instead, this substitute is used to perform the reaction and then is free to catalyze more such atomic actions in chain fashion.

Although still in experimental stages, the new method offers hope of performing nuclear reactions at much lower temperatures than has been possible with previous methods. ///AEC 947/

## 62. TABULATION OF ALL NUCLEAR REACTORS:

In reply to inquiries and requests from several sources, the Atomic Energy Commission has just made available a complete breakdown of all present nuclear reactors planned, built or building.

The summation of 214 reactors gives designations, type, manufacturer and location as well as start-up dates. The complete 13-page report is available on request from the Atomic Energy Commission, Washington 25, D. C. ///AEC/

## 63. HEAVY WATER PLANT TO BE SHUT DOWN:

The future will see little use for heavy water in atomic energy experiments according to a recent AEC announcement. The announcement will be reflected in the closing of some heavy water facilities.

AEC is shutting down its plant near Dana, Ind. It will be placed in "stand-by" condition during 1957. ///AEC 934/

64. ILLINOIS NUCLEAR POWER PLANT BEGINS OPERATION FEB. 9:

First nuclear power system in the United States designed and built solely for experimentation in the generation of electric power will be formally put into operation at the Argonne National Laboratory of the Atomic Energy Commission in Lemont, Ill., on Feb. 9.

The EBWR (Experimental Boiling Water Reactor) is now undergoing pre-operational tests and will go into full power, supplying 5000 kilowatts of electricity to the laboratory on the date mentioned above. The full power operation ceromonies are scheduled for 2:30 PM and will be witnessed by officials of the Joint Committee on Atomic Energy of the Congress, members of the Atomic Energy Commission, the staff of the Argonne laboratory and representatives of the University of Chicago which operates the laboratory for the Atomic Energy Commission.

///AEC 961/

65. U. S. TO SHIP THREE RESEARCH REACTORS ABROAD:

The Atomic Energy Commission has okayed plans to ship three nuclear reactors abroad. The reactors will be used for peaceful experimental purposes.

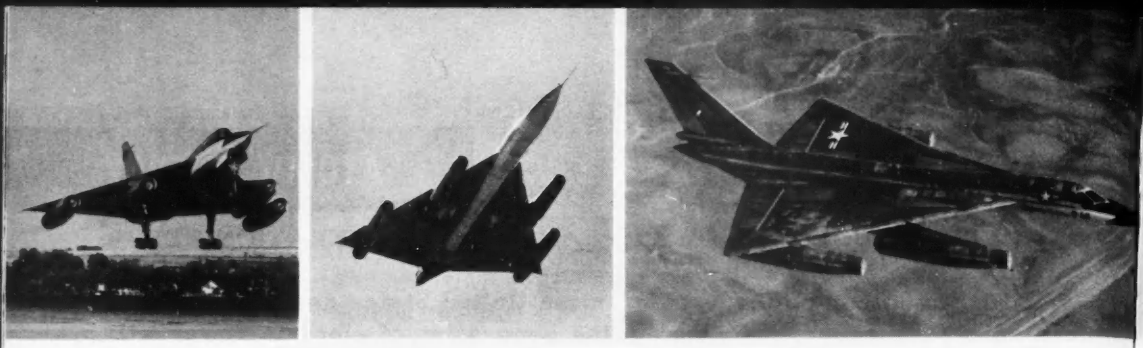
Babcock & Wilcox Company of New York has received AEC approval to ship a pool type reactor to the Conselho Nacional de Pesquisas do Brasil, a department of the Brazilian government, for operation by the University of Saō Paulo. The research reactor is designed to operate at full power of five megawatts.

Also approved for overseas shipment is a reactor going to the Netherlands. License to ship the reactor was given to AMF Atomics, Inc., of New York.

The latter reactor, designed for demonstration, is also a pool type facility operating at 10 kilowatts. It will be consigned to the Ministry of Education in Amsterdam.

Japan is getting a 50 kilowatt water boiler type reactor, which is being built at Canoga Park, Calif., by Atomics International, a division of North American Aviation. The reactor will be constructed near Tokyo for the Japan Atomic Energy Research Institute.

Under a lease agreement between Japan and the United States, the Japanese will receive two kilograms of uranium-235 as fuel for the research reactor. This lease agreement for uranium-235 is the first such transaction under the new foreign assistance program. ///AEC 929-50/



66. CONVAIR B-58 HUSTLER UNDERGOING FLIGHT TESTS:

America's fastest bomber, the B-58 HUSTLER by Convair, is now in flight test stages. The views above clearly show the four General Electric J-79 turbojet engines. The delta-winged bomber features a new type airfoil that droops the leading edge of the outboard section of the wing. The edge droop is technically termed conical camber and is of special value in ultra-high speed flight. ///Air Force Information/

67. GOODYEAR PATENTS FLAT BLIMP:

The patent office reports that Goodyear Aircraft has received a patent for a flat airship. Designed by D. B. Tscudy, Goodyear engineer, the gas filled envelope is in the shape of an airfoil so that it generates lift as it moves like the wing of an airplane. The new airship is said to be capable of much higher payloads since it generates dynamic lift in addition to the static lift from its buoyancy. ///Patent Office/

68. CHANCE-VOUGHT MAKES FIRST F8U FLEET DELIVERIES:

The first two 1000-mile-an-hour-plus F8U-1 CRUSADER fighters for Fleet use have been delivered to NATC, Patuxent River, Md. The CRUSADER holds the national speed record of 1015.428 mph and is a carrier based aircraft. ///NATC Patuxent River/

69. SERVICES MAY COLOR INSTRUMENT PANELS IN PASTELS:

Service aircraft instrument panels, tradionally always black, may soon be changed to gray and green pastels. Separate tests by the Navy's Air Material Center and the Air Force Air Research and Development Command came to the same conclusion: light color backgrounds in soft shades make it easier for pilots to assimilate instrument data. Some new Navy aircraft by Grumann will test colored panels in the Fleet.
///Naval Aviation News 01-22/

70. DOD CONFIRMS DATA'S SCOOP ON POLARIS MISSILE:

The Department of Defense has confirmed that the Navy is developing the POLARIS IRBM missile. First public disclosure of the new POLARIS was made in the January 1st issue of DATA.

Major contractor for POLARIS is Lockheed Aircraft. ///DOD/

71. CONTRACTS:

Bendix awarded $27 million for production of Navy TALOS.

Temco receives $16 million for new missile still classified.

Cessna wins competition for Air Force light twin engine executive aircraft. Initial order for 80 model 310's. Value of $5 million.

Convair gets $145 million for design and test of Air Force ATLAS.

Martin wins $358 million for design and test of Air Force TITAN.

Douglas awarded $67.5 million for work on Air Force THOR.

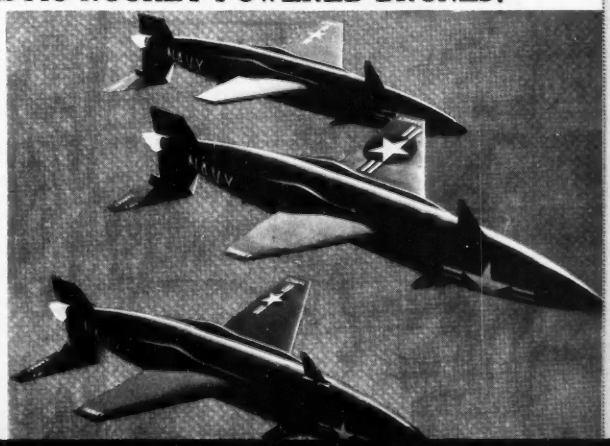
*Note that all awards above with the exception of the Cessna order are for missiles. ///Pentagon OPI 0107, 0117, 1231, 0114/

72. ARMY EAGER FOR VERTICAL AND SHORT TAKEOFF VEHICLES:

The Army is utilizing all available resources to develop simplified, reliable vertical and short takeoff and landing air vehicles that can operate from rough, unprepared terrain. Work has started on a new lightweight observation helicopter for use with the Army's new ground reconnaissance units. In the cargo field, improved $1\frac{1}{2}$ ton and 3 ton payload helicopters and STOL airplanes are being developed. ///Army OPI/

73. RADIOPLANE DELIVERS PLASTIC ROCKET POWERED DRONES:

A new target drone aircraft made of plastic by the Radioplane Company and powered by rockets has been delivered to the Navy. The target missile, the XKD4R-1, is capable of being launched from the wings of fighter aircraft and then flies itself. ///BuAer TIO/



74. EXPANSION AT SOUTH CAROLINA MARINE CORPS STATION:

Four miles west of the Marine Corps Auxiliary Air Station at Beauford, S. C., 2565 housing units to accomodate 11,000 persons are being built. The housing community will be constructed under the Capehart Plan for the Marines and their families stationed at the new jet air base at Beaufort.

Arrival of the first jet squadrons at the new base will begin soon with full operations of squadrons to be underway by late summer of '57.

New construction of air base facilities, valued at over $21 million, includes five hangers, eight enlisted men's barracks, a 2500-man mess hall, a chapel, two warehouses, a central heating plant, recreation and enlisted mens' clubs, officers' club, two 8000-foot runways, high speed jet refueling system, parking aprons and utility systems.

An additional $16 million has been authorized for later construction. ///Marine Corps OPI/

75. NEW OFFSHORE PLATFORMS IN GULF OF MEXICO:

Recently off the designing boards, the Navy's newest type man-made islands are already in the process of fabrication. There will be two of them and they will plant their stilts on the undersea shelf off the Florida Coast in the Gulf of Mexico. Their official designation as Project STAGE refers to their raised platform construction.

These latest sea-going platforms differ considerably in size, design and purpose from the Texas Towers, which are being erected off the Atlantic coast. Where the latter are designed to keep a radar eye out for any threat to the nation's defenses, the new off-shore installations will be used primarily for research in the field of oceanography. The STAGE structures are smaller and will be supported on a number of braced steel cylinders instead of the three big columns which support the Towers. ///CEC BULLETIN 12-22/

76. BIDS:

1. ADC type ammunition storage facilities needed at George AFB, Victorville, Calif. Bid opening 19 Feb. Write Los Angeles District, Corps of Engineers, 751 S. Figuroa St., Los Angeles. Re: IFB-ENG-04-353-57-60.

2. Family housing units needed in San Diego. Complete housing units including walks, fencing, utilities and related work at Marine Corps

Recruit Depot, Camp Matthews, Naval Hospital, Naval Air Station, Miramar, San Diego, Calif. Bid opening 19 Feb. Deposit of $100. required for plans and specs. Write District Public Works Office, Eleventh Naval District, San Diego. Re: IFB 997/56B.

3. New housing project at Myrtle Beach AFB. Total of 800 family units to be constructed. Bid opening 12 March. Write Headquarters, Air Material Command (MCPSDC-2) Wright Patterson AFB, Ohio. Re: IFB-38-606-57-27. ///Commerce-Office of Field Services/

77. HIGH SPEED DITCH DIGGER TESTED BY ARMY ENGINEERS:

A fast ditch digging machine capable of scooping out a four-foot deep trench at the rate of 20 feet a minute is being tested at the Engineer Proving Ground at Fort Belvoir, Va. Although designed for rapid excavation for field fortifications and utility trenches, the Army forsees possible use as a means of providing protection to civilians as well as troops against flash burns, fragmentary bombs or radioactive blast in case of enemy attack.

The 40-bucket earth-eater can bite down six feet and can carve out a foxhole in 30 seconds. ///Engineer R&D Lab, Ft. Belvoir/

78. NEW HOUSING BILLS:

1. Joint Senate-House measure sponsored by Sen. Hubert Humphrey (D., Minn.) and Rep. Wright Patman (D., Tex.) to channel a total of $1 billion into the VA home loan program for direct loans. This money would come from the National Service Life Insurance reserves. In addition, the measure calls for an added $2 billion allocation to the Federal National Mortgage Association for the purchase of VA mortgages.

2. A House bill, authored by Rep. Albert Rains (D., Ala.) which would provide $1 billion from the NSLI reserves to expand the VA mortgages.

3. A bill introduced by Rep. George A. Shuford (D., N. C.) to stop the VA from referring loan requests to the Voluntary Home Mortgage Credit Program for possible fulfilling by private lenders. Under existing procedure, if veterans with VA entitlement cannot obtain a private loan in their home communities, VA refers the matter to VHMCP. If within 20 days VHMCP is unable to place the loan in private channels, the veteran becomes eligible for a direct loan. ///Real Estate Assoc/

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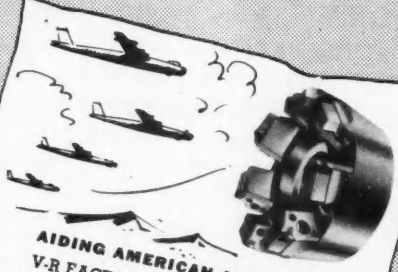
V-R CARBIDE ROCK BITS are setting new performance records across the nation on all types of construction projects. Their success lies in a V-R carbide developed exclusively for percussion bit use.



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79. ATMOSPHERIC EFFECTS ON PROPAGATION:

Tracking and radio guidance of long range missiles require precise knowledge of the refractive effects of the atmosphere. Equally important, accurate vectoring information for anti-missile devices must also take into account these effects. Thus the characteristics of atmospheric effects are of great importance to the Air Force.

Using the sun as the source of radio frequency energy, the Electronics Research Center of the Air Research and Development Command is studying the effect of the atmosphere on microwaves and meter wavelength radiation. Both the ionosphere and the troposphere produce refractive effects and scintillations on solar radio frequency radiation.

The photo above, a multiple exposure of the rising sun taken at five-minute intervals, visually proves the atmospheric effects in that the sun, as it rises, appears to travel along an arc rather than along a straight line. ///ARDC 0118 26-57/

80. MILITARY RELIABLE TUBE PROGRAM:

A paper presented by Keith C. Harding of the Navy's Bureau of Ships at the Third National Symposium on Reliability and Quality Control in Washington on 14 January, gives insight to the future of the military reliability program. The paper discusses operational reliability, tube developments, better specifications, rates of deterioration and has curves and graphs on typical equipment to support drawn conclusions.

With reliability tests in terms of mean time to failure now being specified by the Navy in certain contracts and no doubt soon to be followed in other service specifications, this paper is certainly of value.

DATA has a limited supply of copies of the 11-page Harding report available to subscribers on request at no charge.

In addition to the Harding report, a few copies of some of the other papers presented at the Symposium are available.

///Symposium on Reliability and Quality Control/

81. RADAR MORTAR LOCATES ENEMY POSITION IN SECONDS:

A radar mortar with an electronic brain that can find the location of enemy positions in seconds has been perfected by the Army Signal Corps at Fort Monmouth, the Army announced Jan. 28.

Using a new beam technique, the locator, known as the AN/MPQ-4, pinpoints enemy positions with lightning like speed. Compact and mobile, everything needed to operate it is mounted on a single two-wheel trailer. It can be operated either on the trailer or with the console in a foxhole 150 yards away for remote control to insure safety of the operator. Photos available on request. ///Pentagon OPI 0128/

82. MILITARY STUDIES ON SINGLE SIDEBAND COME THICK NOW:

Everybody is getting into the act on single sideband now. The Army wants it (DATA 1/1/57) and now the Navy presents a six-page discourse on the merits of the new method of transmission complete with comparison curves and graphs in the January issue of the Bureau of Ships JOURNAL. The Navy article starts out by saying, "Communications by single sideband techniques will require the use of less power and less frequency spectrum and will bring more efficient use of networks. Also, the communications will be less vulnerable to the fects of radio interference, multipath and selective fading as compared with communications by conventional amplitude modulation.

The military services, as well as industry, plan to use these advantages to the maximum as soon as possible."

The Commerce Department has a best-seller on their hands with a complete compilation of single sideband information just released through the Office of Technical Services. Ask for PB 11837 Single Sidebands in Communications, OTS, Department of Commerce, Washington 25, D. C. $2.75. ///Commerce and BuShips/

83. COMPUTER SOLVES BOMB FORECAST PROBLEMS:

By using a UNIVAC Scientific computer, manufactured by Sperry Rand, the Air Force is solving armament problems at Eglin AFB, Fla. Presently being used to forecast where bombs will drop, the new computer is also used to process other ordnance test data. Results may effect the design of new armament equipment. ///ARDC 0117 19-57/

84. $38 BILLION BUDGET ASKED FOR FISCAL 1958:

President Eisenhower has asked Congress for $38 billion to run the military forces during fiscal year 1958. This is about $3 billion more than during the current fiscal year.

The budget message cited the high cost of new weapons.

Military forces will remain at about current levels. Total force strength will be 2,800,000 at the end of fiscal year 1958, compared with a Dec. 31, 1956 figure of 2,779,547.

"The combat power of our divisions, wings and warships has increased to such an extent that it is no longer valid to measure military power in terms of the numbers of such units," the President said, "The overall combat power...is much more important than its mere size."

Here is what our military forces will look like during fiscal year 1958:

ARMY: 17 divisions; 9 regiments; 6 atomic support commands; 127 anti-aircraft battalions. One million men will comprise the Army total personnel force. National Guard will have 400,000 men, Army Reserve will have 297,000. Army Aviation will title 5031 planes compared with a current total of 4198 aircraft.

NAVY: Active ships will total 983 as compared with the current 969. The 983 ships will include 422 warships and 561 support vessels. Carrier air groups will remain at 17, while carrier anti-submarine squadrons will grow by one to a total of 20. Active aircraft inventory will total 11,790. Active duty military personnel will total 675,000 as comparedwith the current 673,000. Naval Reservists in pay drill status will total 150,383.

MARINE CORPS: Will continue to maintain three divisions and three aircraft wings. The Marine units will be equipped with atomic weapons. Fighting personnel will total 200,000 as compared with the current strength of 199,947. Reserve Marines will total 49,634 during fiscal year 1958.

AIR FORCE: Wings being dropped from the current 134 (which includes one wing recently activated but not manned or equipped) to 128. The 128 wings are broken down as 45 strategic, 32 air defense and 51 tactical wings (the tactical wings include 15 heavy, medium and assault troop carrier wings). Active aircraft inventory will total 24,398 compared with the current 26,514 active planes. Air Force personnel will go up from the current 915,000 to 925,000 for fiscal year 1958. The Air National Guard will be made up of 72,900 men, while strength of the Air Force Reserve will total 79,710 personnel.

Therefore, in summary, although numbers will not change much, inflation has pushed the budget up $3 billion. ///Pentagon OPI SPL/

85. NEW CABINET COOKSET TO REPLACE ARMY FIELD RANGE:

A new cabinet cookset capable of feeding 50 men and needing only 11 repair parts instead of the presently required 49, was announced by the Army.

Designed and developed by the Quartermaster Corps, the new cookset has been successfully tested and will replace the Army field range now in military supply lines. When adopted it will reduce supply inventories and ease field maintenance.

By eliminating special structural members and substituting aluminum sheet and non-critical corrosion resistant steel for nickel bearing steel, component costs are expected to be reduced by approximately $50 per unit. The new range will weigh 114 pounds as opposed to 137 pounds for the old unit. ///Pentagon OPI 0122/

86. NAVY REVIEWS DEVELOPMENT PROCEDURES:

The process through which a new Navy device is advanced from the drawing board to mass production by contractors is reviewed in a report just released to industry through the Office of Technical Services of the Department of Commerce.

Experience has shown, according to the report, that each device must inevitably pass through certain phases, and that efforts to omit one or more phases are usually fruitless. These phases are research, development, lot production, evaluation, design disclosure and production. Requirements for each phase are defined in the report.

The review gives special attention to the recurring problem of proper contractural means of introducing a design to limited production tooling. Important characteristics of a uniform contract are outlined.

The report, PB 121170 Transition from Development to Production, may be ordered from OTS, Department of Commerce, Washington 25. Price 50 cents. ///Commerce/

87. AIR FORCE USES ELECTRONIC MEMORY CONVEYOR SYSTEM:

A conveyor system that remembers push-button instructions to discharge packages in any desired sequence at as many as 20 stations, is now in use by the Air Force at bases all over the country. The system, called ASSET, saves $100,000 per unit annually. ///AF OPI/

## MATERIALS

88. THREE NEW SPECS ON ELECTRICAL INSULATION:

The greatest natural enemy of electrical insulating materials is dampness and the Bureau of Ships is trying to do something about it.

As the result of research to develop materials that will resist the effect of dampness, three new specifications have been prepared for new types of insulating materials that will be especially useful in electronic equipment operating under high humidity conditions.

The following specifications are believed to be the first written for applying the materials described below as electrical insulations in electronic equipment:

1. Epoxy resin glass cloth laminated plastic sheets--type GEE of Specification MIL-P-18177A.

2. Diallyl phthalate resin-orlon (acrylic fiber)-filled molding compounds--type Sdl-5 of Specification MIL-M-18794.

3. Mylar (polyethlene terephthalate) film-backed adhesive tapes-Specification MIL-I-15126B.

These specifications are available through the Bureau of Ships, Department of the Navy, Washington 25, D. C. ///Bu Ships 1-35/

89. ARDC MICROSCOPE STUDIES METAL ATOM STRUCTURES:

Intensive studies of films lying on metal surfaces can now be undertaken with a view toward finding answers to perplexing questions at the Air Research and Development Command. By using a field ion emission microscope invented by Dr. Erwin W. Muller, the ARDC will be able to probe into the whys and wherefores of lubrication, corrosion, friction and surface migration of atoms.

The initial use of the microscope revealed for the first time views of single atoms on the surface of tungsten. Up to this time, microscope photos could determine surface films from 20 to 50 atoms in diameter, but never single atoms. With Muller's field ion emission microscope, which magnifies up to five million times, films with only one atom in diameter can be photographed for research. ///ARDC AF Chem/

90. TESTING AT 10,000 MPH AND 9000 DEGREES (F):

A facility for testing missiles, materials and their melting points is being developed by Cornell Aeronautical for ARDC. ///ARDC 0128/

91. NEW RESUSCITATOR device announced by the Army Chemical Corps and the Office of the Surgeon General. Developed primarily to treat nerve-gas casualties while in battle, the resuscitator is also able to give artificial respiration for drowning cases, suffication and similar accidents. It permits respiration in contaminated air. ///Army Photo 0104 856/

92. A-SUB CREW GETS LESS RADIATION ON SUB THAN ASHORE:

The medical officer aboard the nuclear-powered submarine USS NAUTILUS not only is going to give the 106-man crew a clean bill of radiation health but has found that they've actually been exposed to less radiation than most people at home.

What makes this all the more remarkable is the fact that the men of the NAUTILUS lived in cramped spaces which put the uranium fuel reactor and its related radioactive equipment close to the crew on a seven-day 24-hour-a-week basis.

The medical officer, Dr. John H. Bersole, explained that sea water surrounding the sub acts as a shielding effect and protects the crew from the radiation everyone ashore is exposed to in the form of cosmic rays from outer space. ///Bu Med/

93. NEW MEDICAL STUDIES AVAILABLE:

Three new studies sponsored by the Wright Air Development Center have been released and made available to the public this week.

1. PB 121528, Human EKG and Common Variations. $2.
2. PB 121382, Orthostasis and the Kidney. $3.
3. PB 121572, Studies in Respiratory Physiology. $6.

A graphic summary of infectious diseases and a report of research into the adaptability of animals to ionizing radiation are also available.

1. PB 121449, Graphic Summary of Infectious Diseases. $1.50.
2. PB 121352, Adaptation to Ionizing Radiation. Price 50 cents.

Order through OTS, U. S. Dept. of Commerce, Wash. ///Com/

94. NUCLEAR POWERED CRUISER TO BEGIN CONSTRUCTION:

Try to find the exhaust stacks in this artist's concept of the new guided missile nuclear-powered cruiser scheduled for construction in fiscal 1957. This new cruiser will carry the REGULUS II, TALOS and TERRIER guided missiles. Subject to further negotiations, the Quincy yard of Bethlehem Steel will get the Navy contract. ///BuShips TIO/

95. U. S. TO BUILD 29 NEW MERCHANT SHIPS:

Two bulk carriers and 27 new tankers, totaling 1,088,250 dead-weight tons, are planned under proposals made by private shipping companies and given tenative approval by the U. S. Maritime Administration. The new proposals are in addition to 31 approved and announced last November. ///Commerce/

96. ATOMIC SUB NAUTILUS TO BE REFUELED IN SPRING:

Don't you wish your car could go 55,000 miles before needing to be refueled? The USS NAUTILUS, the nation's first atomic submarine, has already steamed more than that and is still going strong. It finally gets a new shot of uranium this spring. ///Pentagon OPI 0116/

97. NUCLEAR POWERED CARRIER WILL COST $300 MILLION:

That's cheap says Rear Admiral Albert G. Mumma, Chief of the Navy's Bureau of Ships. First estimates for the new carrier ran about $400 million. The million dollar saving comes from better know-how in atomic ship construction and closer evaluation of all figures. The Chief of BuShips believes the cost will continue to come down as more nuclear knowledge is aquired. ///BuShips TIO/

98. NAVY'S HELICOPTER CARRIER IS INVASION VEHICLE:

The USS THETIS BAY (CVHA-1), first helicopter assault carrier, was commissioned recently at the San Francisco Naval Shipyard. The new type vessel will carry helicopters exclusively.

Job of the THETIS BAY will be to launch into battle large helicopters loaded with marines and their field guns, trucks and supplies. Assault waves of such helicopters can carry the marines to objectives miles behind enemy beaches.

Large concentrations of men, ships and landing craft in a beach area are extremely vulnerable to atomic attack. Therefore changes in the nature of amphibious warfare have been under study since World War II. The Navy and Marine Corps have developed a new concept of amphibious operations--vertical envelopment--based on the use of the helicopter. The 'copters, loaded with combat-ready troops, fly inland from carriers. They fly over the enemy defenses and seize critical points dominating the beach. At the same time, surface landings are being made on the beach. The helicopter troops are free to advance inland or link up with parent forces or the beachhead. ///BuShips /

99. MINESWEEPS AND TUGS MAY BE REPLACED BY 'COPTERS:

Minesweepers that endeavor to sweep an area of a sea or river clear of mines must expose themselves to considerable danger by proximity of contact. But if the exploding device dangles from a 'copter in the sky, then the operation becomes relatively safe. In addition, the airborne vehicle is cheaper.

As towing craft for removing disabled vessels from combat areas or dislodging landing craft from beaches, the 'copter is also ideal. On the surface of the water, relatively little force is needed to move a large ship.

The helicopter towing operation may have more possibilities in the civilian field. Navy officials can see where gulf and river craft can be helped along considerably by a helicopter hook-up under conditions where regular towboats might not be available or where the towboats might find themselves fouled up by the same circumstances that were stalling the other vessels.

Official Navy photos showing towing and sweeping operations using tandem rotor helicopters are available. ///Navy Information/

## TRANSPORTATION

100. NAVY EXPLORERS in Little America in the Antarctic will use this crevasse detector attached to a standard Navy Weasel vehicle to make 600-mile jaunt between Marie Byrd Land and Little America Five. A six-man Army Transportation Corps team will assist the Navy in this important project which is planned as part of the International Geophysical Year. One of the things scientists will try to discover in these South Pole snow travels is whether or not the ice cap covering the Antarctic area is receding. ///Task Force 43/

101. ALL AMERICAN BUILDS JET CAR FOR NAVY TESTS:

A jet-powered car, painted bright red, is currently racing at speeds of more than 200 mph in testing aircraft arresting gear. The car can attain the speed of a landing jet plane and at the same time push a load comparable to the weight of a twin-engine bomber. Powered by four jet engines, the car tests the strength of gear built to stop high speed jet aircraft on landing. ///Armed Forces Press 01 /

102. AERIAL TRAMWAY FOR SHIP-TO-SHORE SUPPORT:

An aerial tramway for landing supplies ship-to-shore across open beaches without the use of piers or other harbor facilities has been developed by the Army to help break one of the logistics bottlenecks of military landings.

At Fort Eustis, Va., the Transportation Corps has constructed a series of 100-foot-high steel towers extending half a mile into the James River and ending at a specially constructed sea terminal--a mobile, self-elevating pier anchored offshore--which is utilized as a loading platform.

Parallel steel cables supported by towers provide the tracks for self-propelled "skycars". Powered by 135 horsepower gasoline engines, these units can shuttle 15 to 20 tons of cargo at a time at speeds up to 30 miles per hour.

The aerial tram can speed 270 tons of cargo an hour between the beach and the inland terminal. ///Army Information/

103. NEW FIELD ARTILLERY GUIDED MISSILE, LACROSSE, a highly accurate weapon, was announced Jan. 29 by the Department of the Army.

LACROSSE answers calls for fire in the same time required for conventional artillery and with rapidity in the field comparable to that of the 105 mm howitzer.

Essential components in the system are the missile, a truck mounted launcher mounted on a standard Army truck and a guidance station.

The LACROSSE system was developed under Army Ordance contract by the Cornell Aeronautical Laboratory of Buffalo, New York. Cornell Laboratory has been prime contractor throughout the design and development phases. Glenn L. Martin Aircraft will receive an eight million dollar production contract. ///Pentagon OPI 0129/

104. A GIANT-SIZE SOLAR FURNACE capable of concentrating the sun's rays to produce temperatures comparable to those generated by an atomic explosion will be erected at the Quartermaster Research and Engineering Center, Natick, Massachusetts, the Department of the Army announced Jan. 29. Major contractor will be the D. S. Kennedy Co., Cohasset, Mass. It will be utilized for laboratory testing of Quartermaster designed materials intended for the protection of military personnel against the thermal effects of nuclear and other weapons.

The installation consists of four principal elements: heliostat, concentrating mirror array, attenuator, and test chamber, occupying an area about 125 feet in length by 40 feet in width. An automatic positioning system drives the heliostat and keeps it constantly at the correct angle with the sun regardless of the time of the day, month or year. ///Pentagon OPI 0129/

105. FIRST OF A SERIES OF SKYHOOK BALLOON FLIGHTS was launched from Guam Jan. 27 and reached an altitude of 108,000 feet, the Navy announced. The plastic SKYHOOK balloon, manufactured by Wisen Research, Minneapolis, was launched for the Office of Naval Research and the Atomic Energy Commission under Project EQUEX '57.

Guam was selected as the launching site because of its proximity to the Geomagnetic Equator. This region is of interest to scientists because there the earth magnetic field filters out of the cosmic ray flux all but the very high energy particles. ///Pentagon OPI 0129/

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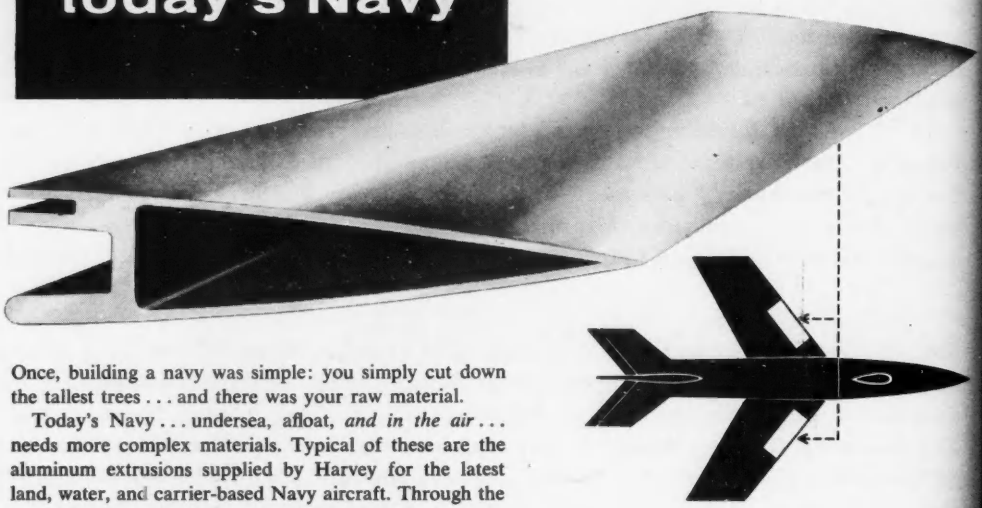

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